

CLAIMS

1. Multi-step reduction gear in planetary construction, especially an automatic transmission for a motor vehicle, including a drive shaft (1) and an output shaft (2), which are arranged in a housing (G), three single rod planetary gears (P1, P2, P3), at least seven rotational shafts (1, 2, 3, 4, 5, 6, 7), as well as at least six shifting elements (03, 04, 14, 17, 36, 56), including brakes and clutches, whose selective engagement brings about different reduction ratios between the drive shaft (1) and the output shaft (2), so that seven forward gears and one reverse gear can be realized, wherein the drive takes place through a shaft (1), which is continuously connected with the sun wheel of the first planetary gears (P1), wherein the output takes place through a shaft (2), which is continuously in connection with the annulus of the second planetary gears (P2) and an element of the third planetary gears (P3), wherein a shaft (3) is continuously connected with the annulus of the first planetary gears (P1), wherein a shaft (4) is continuously connected with the rod of the second planetary gears (P2) and a further element of the third planetary gears (P3), wherein a shaft (5) is continuously connected with a further element of the first planetary gear set (P1), wherein a shaft (6) is continuously connected with the sun wheel of the second planetary gears (P2), wherein a shaft (7) is continuously connected with the sun wheel of the third planetary gears (P3), whereby the shaft (3) can be coupled to the housing (G) through a brake (03), shaft (4) can be coupled to the housing (G) through a brake (04), a clutch (14) detachably connects shaft (1) and shaft (4) with each other, a clutch (17) detachably connects shaft (1) and shaft (7) with each other, a clutch (36) detachably connects shaft (3) and shaft (6) with each other, and whereby clutch (56) detachably connects shaft (5) and shaft (6) with each other.

2. Multi-step reduction gear according to claim 1, wherein the shaft (1) is continuously connected with the sun wheel of the first planetary gears (P1), and wherein the shaft (5) is continuously connected with the rod of the first planetary gears (P1).

3. Multi-step reduction gear according to claim 1, wherein the shaft (1) is continuously connected with the rod of the first planetary gears (P1), and wherein the shaft (5) is continuously connected with the sun wheel of the first planetary gears (P1).

4. Multi-step reduction gear according to one of the preceding claims, wherein the shaft (2) is connected with the annulus of the second planetary gears (P2) and the annulus of the third planetary gears (P3), and wherein the shaft (4) is continuously in connection with the rod of the second planetary gears (P2) and the rod of the third planetary gears (P3), whereby the first planetary gears (P1) and the third planetary gears (P3) are constructed as positive planetary gears and the second planetary gears (P2) is constructed as negative planetary gears.

5. Multi-step reduction gear according to claim 4, wherein the second planetary gears (P2) and the third planetary gears (P3) are combined as Ravigneaux planetary gears with a common rod and a common annulus.

6. Multi-step reduction gear according to claim 1, wherein the shaft (2) is connected with the annulus of the second planetary gears (P2) and the rod of the third planetary gears (P3), and wherein the shaft (4) is continuously connected with the rod of the second planetary gears (P2) and the annulus of the third planetary gears (P3), whereby the second planetary gears (P2) and the third planetary gears (P3) are constructed as negative planetary gears, and the first planetary (P1) is connected as a positive planetary gears.

7. Multi-step reduction gear according to one of the preceding claims, wherein additional free wheelings can be used on any suitable position.

8. Multi-step reduction gear according to claim 7, wherein the free wheelings are provided between the shafts (1, 2, 3, 4, 5, 6, 7) and the housing (G).

9. Multi-step reduction gear according to one of the preceding claims, wherein the drive and output are provided on the same side of the housing.

10. Multi-step reduction gear according to one of the preceding claims, wherein an axle and/or a distributor differential is arranged on the drive side or the output side.

11. Multi-step reduction gear according to one of the preceding claims, wherein the drive shaft (1) is separable from a drive motor through a clutch element.

12. Multi-step reduction gear according to claim 11, wherein a hydrodynamic converter, a hydraulic clutch, a dry starting clutch, a wet starting clutch, a magnetic powder clutch, or a centrifugal clutch is provided as a clutch element.

13. Multi-step reduction gear according to one of the preceding claims, wherein an external starting element, especially according to claim 12, can be arranged behind the transmission in the direction of the force of flow, whereby the drive shaft (1) has a fixed connection with the crankshaft of the motor.

14. Multi-step reduction gear according to one of the preceding claims, wherein starting takes place using a shifting element of the transmission, whereby the drive shaft (1) is continuously connected with the crankshaft of the motor.

15. Multi-step reduction gear according to claim 14, wherein the clutch (56) or the brake (04) can be used as a shifting element.

16. Multi-step reduction gear according to one of the preceding claims, wherein a torsion vibration damper can be arranged between motor and transmission.

17. Multi-step reduction gear according to one of the preceding claims, wherein a wear-free brake can be arranged on each shaft.

18. Multi-step reduction gear according to one of the preceding claims, wherein an auxiliary output can be arranged on each shaft for driving additional units.

19. Multi-step reduction gear according to claim 18, wherein the auxiliary output can be arranged on the drive shaft (1) or the output shaft (2).

20. Multi-step reduction gear according to one of the preceding claims, wherein the shifting elements are constructed as load-shifting clutches or brakes.

21. Multi-step reduction gear according to claim 20, wherein disk clutches, strap brakes and/or cone clutches can be used.

22. Multi-step reduction gear according to one of claims 1 to 19, wherein form-locking brakes and/or clutches are provided as shifting elements.

23. Multi-step reduction gear according to one of the preceding claims, wherein an electrical machine can be installed on each shaft as a generator and/or as an additional drive machine.